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# Hazardous Energy Control Policy
# Lock-Out/Tag-Out

In accordance with the University Policy on Environmental Health and Safety, applicable local, state and federal regulations, recognized standards and the collective bargaining agreement, the University of Massachusetts Amherst shall provide the faculty, staff and students with the Hazardous Energy Control Policy, inclusive of Lock-Out/Tag-Out.

In order to provide our faculty, staff, students and other appropriate persons with the necessary safeguards, the following Standard Operating Guidelines, here-after referred to as SOG's have been established. The SOG's have been enacted to ensure that hazardous isolating devices have been properly identified and that equipment and or machines have been properly stopped, isolated and locked or tagged out before employees perform any maintenance or service work. This policy is designed to protect personnel from unexpected energization or start up of equipment, machines or the release of stored or potential energy that may cause discomfort, impairment, injury or fatality.

As referenced in the University policy on Environmental Health and Safety, the Chancellor has delegated responsibility for effective implementation of this policy and SOG to the appropriate deans, directors, chairpersons and supervisors within their respective units. The Facilities Planning Division for the University of Massachusetts shall inform outside contractors of their health and safety responsibilities on campus, before a contract is awarded.

The University of Massachusetts, through the above referenced responsible parties shall implement and continue to support this policy and appropriate SOG for the health and safety of our faculty, staff, students and other associated persons engaged in activities on this campus and its affiliated satellites. The design, implementation, use and evaluation of this policy and SOG is both a legal and moral responsibility for the university and each person, respectively.

Dr. Donald A. Robinson, *Director*
Environmental Health & Safety

# Lock-out / Tag-Out

## 1.0 HAZARDOUS ENERGY CONTROL (Lock-Out/Tag-Out)

1.1 Scope: In accordance with the University Hazardous Energy Control Policy (Lock-Out/Tag-Out), this Standard Operating Guideline (S.O.G.) establishes the minimum requirements for the control of hazardous energy sources when maintaining or servicing equipment and machinery that could cause injury to personnel working for or at the University of Massachusetts Amherst.

1.2 Purpose: This Standard Operating Guideline, here-after referred to as S.O.G. establishes performance objectives for the protection of university faculty, staff, students and outside contractors working at the University of Massachusetts Amherst. The Hazardous Energy Control Policy and this S.O.G. shall provide for personal protection from injury due to unexpected energization, startup or release of stored energy for persons working in, on or around equipment or machinery when it is being maintained, operated, repaired or serviced. These guidelines require that all energy isolating devices for equipment, machinery and processes be properly labeled or otherwise identified, and when required, shall have the appropriate Lock-Out/Tag-Out device attached.

1.3 Application: The Hazardous Energy Control Policy and S.O.G. shall apply to activities such as adjusting, construction, erecting, inspecting, installing, maintaining, operating, repairing or otherwise servicing the equipment, machinery and/or processes. It applies to all energy sources including, but not limited to; chemical, electrical, hydraulic, mechanical, nuclear, pneumatic, radioactive (i.e. laser and x-ray) as well as thermal.

1.3.1 Outside Contractors: When an outside contractor, working at or for the University of Massachusetts Amherst is engaged in adjusting, construction, erecting, inspecting, installing, maintaining, operating, repairing or servicing equipment, machinery and/or processes they shall follow their own Lock-Out/Tag-Out Policy, which conforms or exceeds the requirements of that which is required by OSHA 29 CFR 1910.147. If work being done by the outside contractor requires the assistance of University personnel, then said contractor shall follow any additional requirements set forth in the university policy.

a) The Facilities Planning Division at the University of Massachusetts Amherst will verify at the pre-construction meetings that contractors working at the university and its affiliated satellites have the necessary health and safety policies, procedures and site rules for the protection of the campus community.

## 2.0 DEFINITIONS

Affected Person: A person whose job requires that they operate or use a machine or equipment on which maintenance or service is being performed; or whose job requires that they work in an area in which maintenance or service is being performed

Authorized Person: A knowledgeable individual to whom authority and responsibility to perform a specific assignment has been given by the employer or designee.

Capable of being locked out: an energy isolating device which has, either by design or other attachment or integral part through which a lock can be affixed. Lock-out should be possible without dismantling, rebuilding or replacing the energy isolating device or permanently alter the energy control capacity.

Energized: Connected to an energy source that does or may contain residual or stored energy.

Energy Isolating Device: A physical device that prevents the transmission or release of energy, including but not limited to; circuit breakers, disconnect switches, manually operated switches, slide gates, slip blinds, line valves, blocks and similar devices used to block or isolate energy. Push buttons, light & selector switches, timers and similar are not energy isolating devices.

Energy Isolation Verification: The operation or testing of the equipment, machine or process (push buttons, switches, timers etc.) that will determine whether or not the energy isolation was effective. This process will detect, relieve, disconnect, or restrain any residual or stored energy.

Energy Source: Any source of chemical, electrical, hydraulic, mechanical, nuclear, pneumatic, radioactive (laser or x-ray), thermal, or other type of energy.

Hot Tap: A procedure used in the repair, maintenance and service activities which involves welding on a piece of equipment (pipelines, vessels, tanks etc.) under pressure in order to install connections or appurtenances. It is commonly used to replace or add sections of pipeline without interruption of air, chemical, gas, steam or water distribution systems. This may include an electrical tap to an existing live electrical feeder, using piercing connectors.

Lock-Out: Placement of a lock on an energy isolating device, which insures that the energy isolating device and the equipment, machine and/or process being controlled can not be operated until the lock has been removed by the qualified person who initially installed it.

Lock-Out Device: An approved device which may or may not include a hasp capable of withstanding the environment it shall be exposed to, and that incorporates a lock and a

key that will hold an energy isolating device in the safe position, to protect all affected personnel.

Maintenance and Servicing: Activities including but not limited to; adjusting constructing, inspecting, installing, maintaining, modifying or setting up equipment, machines or processes. This can include adjusting, cleaning, lubricating or unjamming of equipment or machines, where the employee may be exposed to unexpected energization or start-up of the equipment, machines or processes, or the release of any type of hazardous energy.

Qualified Person: An individual who has the appropriate education, experience and training to work in and around the equipment, machinery or process, and knows the effect of operating the controls or equipment.

Substantial: Lock-out devices shall be strong enough to prevent removal without the use of excessive force or unusual techniques, such as with the use of bolt cutters or other metal cutting tool. Tag-out devices shall be strong enough to prevent inadvertent or accidental removal. The attachment of these devices shall be of a non-reusable type, attachable by hand, self-locking, and non-releasable with a minimum unlocking strength of 50 lb. force.

Tag-Out: Placement of a tag on an energy isolating device that indicates that the energy isolating device and the equipment being controlled must not be operated until the tag has been removed by the qualified person who initially installed it.

Tag-Out Device: a prominent warning device, such as an approved tag and a means of attachment which can be securely fastened to the energy isolating device. The tag shall be a two part, perforated tag with the word "Danger" prominently displayed. The tag shall indicate the energy isolating device and equipment being controlled. The tag-out device shall also be capable of withstanding the environment to which it is exposed, exterior or interior.

## 3.0 GENERAL REQUIREMENTS

3.1 General Requirements: The University of Massachusetts Amherst has established the Hazardous Energy Control Policy and this Standard Operating Guideline which includes: energy control procedures, employee training and periodic inspections. Before qualified faculty, staff, students, visitors and contractors perform maintenance or service on equipment or machines where unexpected energizing, start-up or release of stored energy could occur and cause injury or fatality. The equipment or machine shall be made safe and isolated from the energy source, rendering equipment or machine inoperative.

3.2 When Lock-Out/Tag-Out is Required: The Hazardous Energy Control Policy and S.O.G. shall be incorporated and apply to both the maintenance and servicing of equipment and machines. Whenever activities include; adjusting, constructing,

inspecting, installing, maintaining, modifying, servicing or setting up equipment, machines or processes, the use of Lock-Out/Tag-Out shall be incorporated.

- If activities include cleaning, lubricating or unjamming of equipment, machines or processes, or when making adjustments or tool changes where there is a risk to the employee of accidental or unexpected start-up or energization of equipment or other type of hazardous energy, then Lock-Out/Tag-Out is required.

- Lock-Out/Tag-Out is also required when maintenance or servicing of computer controlled equipment, machines or processes is being performed. Lock-Out/Tag-Out unintentional re-energization of the computer controlled equipment, machines and processes.

3.2.1 Physical Plant Notification Lock-Out/Tag-Out after first circuit breaker, disconnect switch, valve or similar control upstream, which can isolate a hazard in its entirety shall be the responsibility of the Physical Plant. The Physical Plant, through the Customer Service Desk shall be notified in advance to perform Lock-Out/Tag-Out, after first circuit breaker, disconnect switch, valve etc.

3.3 When Lock-Out/Tag-Out is Not Required: This policy and S.O.G. does not apply to;

a) Cord and plug connected electrical equipment.

* Exception - Unless the cord and plug can be visually observed to be disconnected by the person performing said maintenance or service from the equipment, machine or process being worked upon, then the attachment of an approved Tag-Out is required.

b) Hot tap operations involving the transmission and distribution of materials and substances such as air, electric, gas, steam, or water when they are performed on pressurized pipes, provided that the university and/or contractor demonstrates:

1) continuity of service is essential
2) shutdown of the system is impractical
3) procedures are followed and special equipment to protect the workers is issued.

1. Minor tool changes, adjustments and servicing that takes place during normal routine operations, provided the work being performed uses alternative measures that provide personnel with the proper protection for maintaining or servicing the equipment or machine.
2. Seasonal shutdowns, “out-of-service” notifications and similar situations

## 4.0 PREPLANNING REQUIREMENTS FOR LOCK-OUT/TAG-OUT

4.1 Survey: a survey shall be conducted to identify all energy isolating sources to determine if equipment, machines, processes and systems can be isolated. The survey shall cover all energy sources including: chemical, electric, hydraulic, mechanical, nuclear, pneumatic, radioactive and thermal, (input and output), sources supplying equipment, machines or processes, as well as latent or residual energy.

4.2 Energy Isolating Devices: Energy Isolating Devices shall be identified or labeled by a qualified person to indicate specific function.

a) the identification and labeling shall be ongoing

b) authorized persons, under the direction of their supervisor(s) shall properly label all new equipment, as well as that which is now being maintained or serviced. The equipment to be labeled shall include, but is not limited to:

1) circuit breakers
2) disconnect switches
    1. piping (air, chemical, electric, fuel, gas, steam and water)
    2. valves

c) in areas or rooms where the equipment being maintained or serviced is not in visual sight of the energy isolating device then the equipment, machine or process shall be labeled with the location, (breaker, disconnect, valve etc.) of said energy isolating device. The location of the energy isolating device can be indicated on or in the equipment, machine or process being maintained or serviced. The energy isolating device shall be capable of being locked in the both the "on" and "off" position.

4.3 Unlabeled or Mislabeled Equipment / Machines: Unlabeled or mislabeled energy isolating devices, equipment or machines shall be properly labeled as soon as possible. Supervisors shall insure that both authorized and qualified persons make the necessary corrections and modifications as required.

a) Equipment Modification or Replacement: When replacement, repair or modification of equipment or machines is performed, and when new equipment is installed, energy isolating devices must also be installed. Energy isolating devices such as disconnects must be placed in close, visual proximity to the equipment, machine or process it serves. Each energy isolating device shall be designed to accept the appropriate lock-out devices.

4.4 Multiple Forms of Energy: Only authorized/qualified persons shall prescribe the appropriate duties and responsibilities relating to equipment, machines or processes involving multiple forms of energy. It shall be the responsibility of the authorized person or supervisor to oversee the method used. The procedure must insure a level of safety equal to an individual lock & key.

## 5.0 COMMUNICATION AND TRAINING

5.1 Compliance Requirements: all affected and authorized persons shall be notified of the requirements of the Hazardous Energy Control Policy and Standard Operating Guidelines.

a) affected persons shall be instructed in the purpose and use of Lock-Out/Tag-Out

b) authorized persons shall receive the necessary training on:

1) how to recognize all applicable hazardous energy sources
2) the adequate method of isolation

c) Unauthorized removal of the lock-out/tag-out device may result in disciplinary action, in accordance with the collective bargaining agreements:

1.written reprimand
2.suspension, or
3.dismissal

### 5.1.1 LOCK-OUT/TAG-OUT DEVICES SHALL BE:

a) approved by a recognized testing agency (i.e. UL, FM etc.)

b) durable and able to withstand the intended environment

c) unique and easily recognizable

d) standardized (i.e. color, format, shape, size, type and warnings)

e) substantial

1) Locks unless opened with a key, must be of such strength that only excessive force or specialized tool could defeat same.
2) Tags must be of such design that accidental removal is minimized.

f) identifiable and able to identify authorized installer

## 6.0 POLICY AND STANDARD OPERATING GUIDELINE COMPLIANCE

6.1 Lock-Out/Tag-Out Requirements: all affected and authorized persons are required to comply with the Hazardous Energy Control Policy and S.O.G.'s. The authorized person(s) shall perform Lock-Out/Tag-Out as indicated here-in. All affected, authorized, knowledgeable persons, upon observing a piece of equipment, machine or process which

is locked out shall not attempt to start, energize or use the equipment or machine. Supervisors shall be responsible for the effective implementation of this policy, and shall when necessary for safety reasons enforce the provisions of this policy as outlined in collective bargaining agreements.

6.2 Capable of being Locked-Out: if the energy isolating device is capable of being locked out, the affected, authorized and knowledgeable person shall utilize a lock-out device.

6.3 Not Capable of being Locked-Out: if the affected, authorized or knowledgeable person is not able to lock-out a piece of equipment, machine or process, then a tag meeting the requirements of 5.1.1. can be used, provided the supervisor can demonstrate that the tag-out will provide the same level of safety as a lock-out device.

## 7.0 PROTECTIVE MATERIALS AND HARDWARE

7.1 Blocks, chains, fasteners, locks, pins, wedges etc.: used to isolate, secure or block the equipment, machine or processes from energy sources, (including latent, residual or stored), shall be supplied to our employees by University. Contractors performing work on campus shall supply their own protective materials and hardware.

7.1.1 All lock-out/tag-out devices shall meet the requirements of section 5.1.1.

## 8.0 LOCK-OUT/TAG-OUT PROCEDURES

8.1 Notification: any and all affected persons shall be notified that maintenance or service is required on a piece of equipment, machine or process, and that the equipment or machine must be shut down and locked-out/tagged-out in order to perform the necessary maintenance or service.

- notification of shut-down can be coordinated by Physical Plant Customer Service
- notification procedures are required before any controls are applied

8.2 Application of Control(s):

1) Prepare for shut down:

    a) notify all affected persons that shut down will occur

2) Equipment or Machine shut down:

    a) shut off or otherwise de-energize the equipment, machine or process using the buttons, switches or valves.

3) Isolate the Equipment, Machine or Process:

a) shut down or deactivate the energy isolating device (circuit breaker, disconnect, valves, slide gates etc.)

4) Affix the Lock-Out and/or Tag-Out Device

5) Relieve, disconnect, restrain, block or otherwise make safe any stored or potential energy:

a) operate push buttons, levers or switches that may contain potential or stored energy
b) block any possible movement of equipment to prevent accidental injury or fatality.

8.3 Restoring Equipment to Service: before the Lock-Out/Tag-Out devices are removed, the following procedures are required:

1) Inspect the Work Area

- make sure that all non-essential items have been removed from the area

2) Relocate Faculty, Staff, Students, Outside Contractors and Visitors

- make sure that the area is clear or that the above referenced individuals are properly positioned or removed.

3) Notify all affected persons that Lock-Out/Tag-Out is going to be removed

4) Remove Lock-Out/Tag-Out Device

- this procedure must be done by the installer of the Lock-Out/Tag-Out device.

5) Notify all affected persons that the work has been completed and the equipment, machines or processes are ready for use.

8.4 Lock-Out/Tag-Out Device Application and Removal: It shall be the responsibility of the authorized employee performing service or maintenance on equipment or machines to affix and then remove his or her own lock-out/tag-out device.

8.4.1 **No employee will be allowed to remove a lock or tag affixed by another authorized employee.** If more than one lock-out or tag-out device has been applied to a hasp or other group lock-out/tag-out application, (see section 10.0) then each affixing authorized employee shall remove their own lock or tag, before the equipment or machine is re-energized, following the procedures noted in section 8.3

8.5 Emergency Removal of Lock-Out/Tag-Out Device(s): When the authorized employee who initially applied the lock-out/tag-out device is not available to remove it, then the device can be removed under the direction of the foreperson/supervisor provided that the following procedures are performed:

1) verify that the employee is not on campus

2) all reasonable efforts to contact the original authorized employee who affixed the lock or tag have been made to inform him/her that the device has been removed

3) that the original authorized employee that installed the lock or tag has been made aware of emergency removal before he/she resumes work on campus.

## 9.0 OUTSIDE CONTRACTORS

9.1 Outside Contractors: shall have their own written Lock-Out/Tag-Out Policy and Procedures as required by OSHA, (Occupational Safety and Health Administration) 29 CFR 1910.147. See section 1.3.1.

## 10.0 GROUP LOCK-OUT/TAG-OUT

10.1 Group Lock-Out/Tag-Out: When maintenance and/or servicing of equipment and machines is to be performed by authorized/qualified person(s) of a crew, department, shop, zone or other group, then group lock-out/tag-out devices shall be used.

10.1.1 Primary responsibility for group lock-out/tag-out is obligation of the authorized, appointed person for a set number of employees working under the protection of a group lock-out/tag-out device. Depending on circumstances, and how the crew, department, group or zone is arranged, the authorized, appointed person shall exercise one of the following two procedures.

a) If more than one authorized individual is required to perform maintenance or service on equipment and/or a machine, then each authorized employee shall place lock and/or tag provided to them on the energy isolating device(s), or Hazardous Energy control Standard Operating Guidelines

b) If one authorized, designated individual of a work crew, such as a foreperson or supervisor, with knowledge of the crew deems it safe practice, then that person may lock-out/tag-out equipment for the entire group. If this type of group lock-out/tag-out procedure is performed, it shall be the responsibility of that authorized, designated individual to carry out all steps of the lock-out/tag-out procedure and then inform the rest of the crew, department, group or zone when it is safe to work on the equipment or machine. It shall then be up to that individual to follow the procedures for

removal of the lock-out/tag-out device in accordance with the policy and standard operating procedures. As required, only the person who has affixed the lock or tag can remove it, (after it has been verified that all individuals are clear).

10.2 Shift or Personnel Changes: orderly transfer of Lock-Out/Tag-Out devices between off- going and on-coming personnel must be carried out for reasons of conformity, health and safety. The shop, department or division supervisor shall identify specific procedures for this purpose.

## 11.0 DEPARTMENTAL COLOR CODING

11.1 Departmental Color Coding: a color coding identification program has been instituted to help identify a specific department, in case of tag loss or environmental damage. The following is the lock color code for each department:

Auxiliary Services - Blue

EH&S - ~~Purple~~ (Amended to Black because Purple is unavailable)

Physical Plant - Red

Housing Services - Green

OIT - Orange

Other - Gold

## 12.0 LOCK-OUT/TAG-OUT EVALUATION AND REVIEW

12.1 An annual review of this policy and S.O.G. shall be done in order to modify and improve the existing requirements. This shall be done in accordance with the requirements of 29 CFR 1910.147 and the University of Massachusetts Amherst Lock-Out/Tag-Out Committee.

## 13.0 COLLECTIVE BARGAINING AGREEMENT

13.1 In accordance with the collective bargaining agreements and other health and safety requirements previously negotiated, the University of Massachusetts Amherst shall provide each employee, as well as faculty, staff and students with a work site that is, in so far as possible, free of recognized health and safety deficiencies.